MASTER OF SCIENCE
IN
INFORMATION TECHNOLOGY
MANAGEMENT

IMPLEMENTING AN INTRANET–BASED PERSONNEL DATA SYSTEM IN COMBAT ARM SCHOOLS

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This thesis presents a model of intranet implementation for a military organization. The model includes the design and implementation of a relational database for a personnel department which is connected to the intranet. The database connectivity from back-end to front-end constructed by Active Server Pages (ASP), enables the users to manipulate the database via their web browsers.

From the technical aspect, in order to achieve a successful and secure intranet implementation, several software and hardware components are reviewed and some are recommended. The intranet pages are built with Microsoft Front Page 98. This prototype will be a first and big step for this organization to initiate a transformation from the traditional manual world to a digitized world. Therefore, it is highly expected that there will be a change problem in the organization. From the management aspect, specific change strategies are suggested to manage change.

DoD KEY TECHNOLOGY AREA: Other (Internet, Intranet, Database and Security)

KEYWORDS: Intranet, Internet Technology, Information Technology, Database, and Web-Database Connectivity

A DECISION-MAKING MODEL UTILIZING INFORMATION TECHNOLOGY: COMBINING THE FEATURES OF THE INTERNET, PUBLIC PARTICIPATION, AND PROVEN DECISION-MAKING METHODS

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This thesis research combines several proven methods by which public participation can be used more effectively in a government decision-making process. The research involved fulfills three primary purposes. First, the research provides a flexible user-friendly internet-based platform, whereby the knowledge level of a disparate group of stakeholders can be improved with respect to a complex technical subject. Second, the research demonstrates a method by which stakeholder consensus is derived. Third,

the research exhibits a method by which public values are aggregated, whatever the level of consensus; the data is then provided to the government for use in a decision-making model.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Environmental Quality, Human Systems Interface, Other (Decision Analysis, Decision-Making)

KEYWORDS: Web Technology, Internet, Information Technology, Public Participation, Decision-Making, Value Tree Analysis, Multi-Attribute Utility Theory, Analytical Hierarchy Process, Delphi Method, Median Ranking Method, Hungarian Method, Rank Correlation and Aggregation

IPSec-BASED VIRTUAL PRIVATE NETWORK VULNERABILITY ASSESSMENT

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Virtual Private Networks (VPNs) are an emerging security solution for computer networks in both the government and corporate arena. IPSec, the current standard for VPNs, offers a robust, standards based, and cryptographically effective solution for VPN implementation. Because of the immense complexity of IPSec, effective analysis is difficult. In an environment where Information Warfare in general, and computer network attack in particular, are becoming more pervasive, it is necessary develop a critical, independent evaluation of IPSec from a security perspective.

In order to develop an effective evaluation of IPSec VPNs, it is necessary to first develop a framework with which to analyze the various elements of VPN implementation. This framework can be extended for use as a tool to develop methodologies for VPN attack and exploitation, as well as protection. A Cisco Systems VPN router network is an example of how this framework can be applied to a real-world example.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Computing and Software

KEYWORDS: Virtual Private Networks, Computer Network Attack, Computer Security, Network Security

PLANNING, DESIGNING AND IMPLEMENTING A NETWORK FOR THE NAVAL RESERVE

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This thesis focuses on an analysis of the technology and steps involved in planning, designing and implementing a network for the Naval Reserve Force. The Naval Reserve is undergoing a multi-year program that will dramatically upgrade the Naval Reserve Network. The upgrades are needed to establish an effective Wide Area Network that is compliant with Department of the Navy Chief Information Officer's information technology standards guidance. Through the study, the challenges to implementing an effective network were identified as well as recommended strategies for successfully implementing the network.

The thesis includes a requirements analysis of a typical Naval Reserve Center and a recommendation for a standardized Reserve Center Local Area Network architecture. An overall standard network architecture is needed to improve system performance and interoperability. In addition, the thesis studies how to best stimulate the changes to business practices that will be required to ensure that the network will not be underutilized. The recommendations and information presented will benefit the Naval Reserve Force in their ongoing efforts to implement an effective Wide Area Network and to standardize their Information Technology infrastructure.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Wide Area Network, Local Area Network, WAN, LAN, Network Design, Media, Topology, Hub, Router, Managing Planned Change

DESIGN AND IMPLEMENTATION OF A THREE-TIERED WEB-BASED INVENTORY ORDERING AND TRACKING SYSTEM PROTOTYPE USING CORBA AND JAVA
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Many enterprises are still running and maintaining several operating system and platform dependent legacy applications. The variety of platforms and operating systems poses a challenge to system-wide interoperability and performance, increases the cost of maintenance, locks enterprises into certain vendors, and leads to a lack of an adequate information infrastructure which results in a waste of computer resources, manpower, and time. In this thesis, a component-based three-tiered Web-based Inventory Ordering and Tracking System (IOTS) prototype was designed and implemented that demonstrates the technical feasibility of making an enterprise's applications both interoperable and scalable on a system composed of multiple platforms and different operating systems. The prototype uses CORBA, an industry-backed, non-proprietary, standard-based distributed architecture and Java, a high-level object-oriented language that enables enterprises to leverage the use of the Internet and benefit from the enhancements in the client/server and the decrease in the prices of desktop computers. The prototype demonstrates how to overcome the problem of the stateless nature of HTTP and build the Object Web where Java applets run on the IIOP. The prototype's source code can be tailored to some specific business requirements and enterprises having problems similar to those addressed may benefit from this research and adopt its development methodology.

DoD KEY TECHNOLOGY AREA: Other (Interoperability, Re-Engineering, and Inventory Ordering and Tracking)

KEYWORDS: Interoperability, Re-Engineering, Inventory Ordering and Tracking, CORBA, Java, Database, Electronic Commerce, Internet, and Web-Database Connectivity

AUTOMATED TOOL FOR ACQUISITION PROGRAM MANAGEMENT STUDENTS (ATAPMS)

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This thesis explores the top-level requirements for an Automated Tool for Acquisition Program Management Students (ATAPMS) that is designed to enhance training and education in the acquisition management field. The Department of Defense (DoD) has identified the education and training of the acquisition workforce as a strategy to help make the acquisition system more effective and efficient. As a result, the DoD established the Defense Acquisition University (DAU) to provide the required education and training. More recently, EO 13111 and the Defense Reform Initiative have presented a mandate for the DoD to find ways to use technology to further this strategy.

Currently, the consortium schools of the DAU are using emerging technologies to increase access to their courses. However, the DAU curricula lack automated acquisition management training programs that allow instructors to qualitatively assess students' work.

This thesis recommends a set of top-level requirements for an automated program that are in compliance with the Advanced Distance Learning Initiative. It then illustrates through a prototype module, using a commercial authoring tool, how an ATAPMS can assist the DAU instructors teach the critical aspects of Acquisition Program Management.

DOD KEY TECHNOLOGY AREAS: Computing and Software, Manpower, Personnel, and Training, Other (Acquisition)

KEYWORDS: Acquisition Program Management, Acquisition Reform, Defense Reform Initiative, DRI, Advanced Distance Learning Initiative, ADL, Authoring Tool, Computer Based Training

AN ANALYSES OF INTERNET/INTRANET INFORMATION SYSTEM ARCHITECTURES WITH ORACLE *8i* FOR TURKISH NAVY

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Turkish Navy has made a strategic commitment to Oracle DBMS, by making an enterprise contract with Oracle Corporation, which places Oracle DBMS at the heart of all information processing in Turkish Navy. Ten years later currently established Oracle DBMS based information systems will be legacy systems and Turkish Navy will be bound under Oracle proprietary lock-in, unless careful approach in deploying these new systems is not made.

Oracle 8i is the latest version of the Oracle Corporation's DBMS can be solution to this problem. With Oracle 8i's Java-enabling components-Object Request Broker(ORB), Java Virtual Machine(JVM), and embedded JDBC Driver- Turkish Navy have a wealth of technologies at its disposal. Turkish Navy has a choice of several programming models—PL/SQL, JDBC, SQLJ, CORBA, and EJB; and a choice of protocols—Net8 and CORBA-IIOP. Selecting model over another can be a daunting and very important task. Each model has strengths and weaknesses for a particular task.

This research surveys Oracle Java Platform and researches different development architectures with their pros and cons, and points out the direction that should be taken in order to ensure scalability,

maintainability, interoperability and extensibility of the future systems which will prevent the proprietary lock-in of the certain vendors and their products.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Other (Information System Management)

KEYWORDS: Oracle, Oracle 8i, Enterprise Java Beans, CORBA, Information System Architectures, Microsoft vs. Oracle, Turkish Navy, EJB, Java, PL/SQL

AN ANALYSIS OF DECSION MAKING STRATEGIES USED BY P-3 PILOTS IN HAZARDOUS SITUATIONS

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Effective decision making in aeronautical environments, which often involves high elements of risk, is critical to mission success. Unfortunately, no proven methodology exists to train pilots to make successful decisions. Cockpit decision making has relied on traditional analytical models and methodologies that underestimate the role of pilot experience, expertise and judgment. Naturalistic Decision Making (NDM) models contend that decision makers facing real-world decisions use experience and judgment to make timely decisions without analyzing a multitude of alternatives.

This thesis analyzes 438 P-3 aviation hazard reports (HAZREP) to ascertain which cognitive strategies from either the analytical or naturalistic methodology are more appropriate for handling malfunction situations. The author presents a hybrid model of decision making by P-3 pilots based on the results of the analysis and strategies from both methodologies.

This thesis recommends that decision making training be treated as a core activity of pilots not only in flight school, but after qualification is complete. Training pilots to become experts will improve situational awareness and reduce the number of unfavorable outcomes in hazardous situations.

DoD KEY TECHNOLOGY AREAS: Computing and Software, Manpower, Personnel, and Training, Air Vehicles

KEYWORDS: P-3 Aviation Hazard Report (HAZREP), Aeronautical Decision Making, Naturalistic Decision Making (NDM), Analytical Decision Making (ADM), Situational Awareness, Expert Behavior